RECORD #91

TITLE: Lead Shielding Attached to Safety Related Systems Without 10 CFR 50.59 Evaluations

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

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IE INFORMATION NOTICE NO. 83-64: LEAD SHIELDING ATTACHED TO SAFETY-RELATED SYSTEMS WITHOUT 10 CFR 50.59 EVALUATIONS

Addressees:

All nuclear power reactor facilities holding an operating license (OL) or construction permit (CP).

Purpose:

This information notice is provided to inform licensees of an event at a pressurized water reactor (PWR) where significant quantities of lead shielding were installed on safety-related systems without a proper engineering evaluation as required by 10 CFR 50.59. Licensees are devoting increased attention and resources to reduce radiation fields in an effort to minimize workers' exposure. The NRC encourages these ALARA efforts; however, this event and other similar occurrences illustrate a need to reemphasize the requirements of 10 CFR 50.59. No specific action or response is required.

Description of Circumstances:

During a routine inspection at the Maine Yankee Atomic Power Station on June 8, 1983, an NRC inspector noted that portions of safety-related piping (three-inch hydrogenated waste header pipe) in the primary auxiliary building was covered with lead shielding. Discussions with the plant engineering staff revealed that licensee safety evaluations to support this plant modification had not been performed. Since the licensee had no formal control mechanism to govern the installation, use, and accounting of temporary shielding (in the 1974-75 period), no records existed to document the dates and locations of shielding installations. The shielding was placed on plant systems during the 1974-1975 period when high fuel element failure rates led to increased radiation fields throughout the plant.

After the 1982 refueling outage, the licensee had initiated a program to identify and remove temporary shielding installed on systems inside the containment building, but failed to broaden this effort to other plant areas. Recently implemented improvements in the maintenance and design program would currently prevent shielding installation without required 10 CFR 50.59 evaluations. The controls and procedures currently in place as part of the facility Quality Improvement Program should prevent any reoccurrences.

In response to a Regional Confirmatory Action Letter, the licensee initiated the following corrective actions to identify the extent of the problem and to resolve the safety concerns:

1. Inspection of all safety-related piping in radiological controlled areas outside containment to identify any shielding affixed to or which could affect these systems (e.g., lead insecurely attached to non-safety-related system such that it might fall onto a safety-related system).

2. Removal of all identified shielding and documentation of location and quantity.

3. Identification of any system degradation problems evident after shielding removal.

4. Description and verification of the effectiveness of actions taken during and after the 1982 refueling outage to identify and remove lead shielding from piping inside containment building.

5. Performance of inspections and engineering analyses of the affected systems to ensure their operability under design-basis event conditions.

Detailed inspections were conducted in all accessible areas outside containment and the licensee identified 18 to 20 locations where quantities of lead shielding weighing between 10 and 380 pounds had been installed. By June 21, 1983 all the identified lead shielding had been removed from the safety-related systems. Because of improved fuel integrity performance, radiation surveys conducted after the shielding was removed indicated only two or three of the affected locations would still need any additional shielding. Since only cursory inspections were conducted inside containment because of high radiation dose rates, system walkdowns inside containment will be performed during the next unscheduled plant outage. The licensee found no visual evidence of permanent degradation to piping or its supports.

Any future permanent shielding modifications will be handled as design changes. The licensee also plans to develop a program for control of temporary shielding. Since the temporary shielding had not been readily discernable from other pipe coverings/surroundings, brightly colored temporary shielding materials will be used to enhance identification. At the request of NRC's Region I, the licensee agreed to check the concrete anchor bolt pre-load torque on the piping supports for the affected systems.

Discussion:

Failure to analyze for possible seismic/structural effects (both dynamic/static) of lead shielding on safety-related systems constitutes an unreviewed safety question. Maine Yankee safety-related systems (e.g., safety injection trains) were modified with additional shielding without supporting engineering evaluations to ensure system operability under design-basis event conditions.

Although focused on radioactive waste treatment systems, IE Circular No. 80-18, "10 CFR 50.59 Safety Evalution for Changes to Radioactive Waste Treatment Systems," provides general guidance/clarification regarding the requirements of 10 CFR 50.59. If you have any questions regarding this matter, please contact the Regional Administrator of the appropriate NRC Regional Office, or this office.

Edward L. Jordan, Director
Division of Emergency Preparedness
and Engineering Response
Office of Inspection and Enforcement

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